

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of )  
Federal-State Joint Board Invites )  
Comment on Review of the )  
Definition of Universal Service )

Docket No. 96-45

**Reply Comments of the  
Rural Utilities Service**

**Introduction**

The Rural Utilities Service (RUS) is a rural development agency of the United States Department of Agriculture. For over 50 years, RUS (formerly the Rural Electrification Administration) has been financing the construction of modern telecommunications systems throughout rural America. Today, RUS continues to promote rural telecommunications by providing financing, technical advice, and support to approximately 825 rural local exchange carriers nationwide.

Since the passage of the Telecommunications Act of 1996,<sup>1</sup> RUS has taken an active role in presenting those issues important to rural Americans by commenting on the Commission's proposals to the 1996 Act's universal service provisions.<sup>2</sup> Throughout this process, RUS has attempted to represent the needs and interests of all rural Americans, not just those served by RUS-financed companies and cooperatives.

Through this filing, RUS respectfully requests that the Commission adopt an evolutionary approach to the definition of supported services by establishing an information rate for voice grade service of no less than the V.34 standard.<sup>3</sup> Such an approach will promote rural development in economically depressed rural areas and prevent a widening of the Internet access rate gap between urban and rural consumers. RUS also recommends that mobile service be

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1. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996), codified at 47 U.S.C. §151 *et seq.* [hereinafter 1996 Act].

2. See [www.usda.gov/rus/telecom/telecomact/act.htm](http://www.usda.gov/rus/telecom/telecomact/act.htm) where all RUS comments on the 1996 Act, universal service, and related issues can be found.

3. V.34 is the industry standard for modems commonly known as 28 K modems. It allows a maximum bit rate of 33.6 kilobits per second in both directions over a dial-up voice circuit.

considered as supportable through the universal service fund as it is inherently different from landline service and is clearly essential to education, public health, and public safety.

Under the 1996 Act, the preservation and advancement of universal service is based upon seven principles detailed in Section 254(b). Six of these principles are articulated and the seventh allows for additional principles at the discretion of the Joint Board and the Commission. The definition of universal service is prescribed by four criteria listed in Section 254(c).<sup>4</sup> We believe that we demonstrate, through our comments, that our proposals are consistent with the intent of that definition.

### Rural Development Hinges on the Definition of Universal Service

Economic development today depends upon each community's ability to evolve into a knowledge-based enterprise. States having the healthiest economic structures are said to be "high tech," while those having the weakest economies are known for not attracting or embracing technology. According to The State New Economy Index,<sup>5</sup> financially healthy states share the presence of world-class universities, are at the forefront of information technology and Internet revolutions, and have solid infrastructure that supports innovation. States with the weakest economies are often those most firmly rooted in older economies, most notably those based upon natural resources, mass production, and agriculture.

This disturbing finding is, however, tempered by the following:

While lower-ranking states face challenges, they can also take advantage of new opportunities. The IT revolution gives companies and individuals more geographical freedom, making it easier for businesses to relocate, or start up and grow, in less densely populated states, farther away from existing agglomerations of industry and commerce. But a key policy challenge will be to find a way to extend advanced telecommunications infrastructure to these places. Regionally, the New Economy has taken hold most strongly in the Northeast, the mid-Atlantic, the Mountain West, and the Pacific regions; 17 of the top 20 states are in these four regions. (The three exceptions are Minnesota, Texas, and Florida.) In contrast, 17 of the 20 lowest-ranking states are in the Midwest, Great Plains, and the South.<sup>6</sup>

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#### 4. (c) DEFINITION. -

(1) IN GENERAL. – Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services. The Joint Board in recommending, and the Commission in establishing, the definition of the services that are supported by Federal universal service support mechanisms shall consider the extent to which such telecommunications service –

- (A) are essential to education, public health, or public safety;
- (B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers;
- (C) are being deployed in public telecommunications networks by telecommunications carriers; and
- (D) are consistent with the public interest, convenience, and necessity.

5. *State's New E-Economy Index: Introduction and Results*, See [www.metricnet.com/specials/sneiintro.html](http://www.metricnet.com/specials/sneiintro.html).

6. *The State New Economy Index*. See [neweconomyindex.org/states/summary.html](http://neweconomyindex.org/states/summary.html)

States with traditionally rural economies are often viewed as being technologically challenged and are, therefore, handicapped in their efforts to attract new business opportunities. For example, the state of North Carolina, because of its predominantly rural economy, is ranked 30<sup>th</sup> among all states. Yet North Carolina is home to top-rated universities; one of the nation's strongest tech centers, Research Triangle Park; and such renowned technology firms as Cisco Systems, Nortel Networks, Red Hat, IBM and Ericsson. In an effort to further embrace technology and promote its economic development, North Carolina has identified, as its primary telecommunications objective, the availability of state-wide, affordable Internet access by 2003.<sup>7</sup>

#### Dial-up Internet Access May Provide Rural America's Only Internet Access For Years To Come

To ensure rural Americans' access to the global economy, affordable broadband Internet access should be the objective of Federal and state telecommunications policymakers. Even with the most aggressive Federal and state policies, however, many rural customers are not likely to have that access for some time. Two studies from the National Exchange Carrier Association indicate that the cost of providing broadband to rural areas will be high, suggesting that it will not be feasible for carriers to provide broadband without some form of support.<sup>8</sup>

At the National Summit on Broadband Deployment in Arlington, VA, on October 25, 2001, Federal Communications Commission Chairman Michael Powell said:

According to J.P. Morgan, 73% of households have cable modem service available, and 45% of households have access to DSL. Combined, broadband availability is estimated to be this year almost 85%. The intriguing statistic is that though this many households have availability, only 12% of these households have chosen to subscribe.<sup>9</sup>

From a rural economic development standpoint, Chairman Powell makes two important observations. First, broadband access is not available to 15% of the population, most of whom reside in rural, high cost to serve areas. Second, broadband service penetration rates of 12% are not as high as many had predicted. Consumers are, therefore, taking a more budget-minded approach to their communications needs by connecting to the Internet using voice grade service and modems. Chairman Powell's two observations show just how critical voice grade service is to rural Internet access.

Broadband access will be slow to come to most rural areas, will be costly, and, for many, may not arrive at all without universal service support. This will only serve to increase the economic plight of many rural Americans. The rural economic development that is so desperately needed in many states is functionally dependent upon telecommunications infrastructure. Universal service support is not just about comparable telephone service at comparable prices any more; it

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7. In August 2000, the N.C. General Assembly created the Rural Internet Access Authority and provided it with a series of goals, including a mandate to provide high-speed, affordable Internet access to all North Carolinians by December 2003. See [www.e-nc.org/tech\\_nc/tech\\_overview.shtml](http://www.e-nc.org/tech_nc/tech_overview.shtml)

8. *NECA Rural Broadband Study*, June 21, 2000 and *NECA's Middle Mile Cost Study*, October 24, 2001 See [www.neca.org/broadban.asp](http://www.neca.org/broadban.asp) and [www.neca.org/midmile.htm](http://www.neca.org/midmile.htm).

9. *Remarks of Michael K. Powell*, Chairman, Federal Communications Commission at the National Summit on Broadband Deployment, October 25, 2001. See [www.fcc.gov/Speeches/Powell/2001/spmkp110.html](http://www.fcc.gov/Speeches/Powell/2001/spmkp110.html).

is about economic survival and prosperity throughout 80% of the nation's land mass and 25% of its population.

While RUS-financed rural local exchange carriers are constructing telecommunications facilities that support advanced services, they serve only one-third of the rural population. Locally owned and operated RUS-financed carriers know that the future of their communities depends upon these capabilities; therefore, they have, throughout their existence, taken the steps necessary to provide advanced telecommunications services – steps that they would have been unable to take without universal service support.

Based upon Chairman Powell's observations, RUS would argue that access to broadband service, because it is available to 85% of all customers, should be included in the definition of universal service. If access to broadband service is not included in the definition, it will not become available to most rural customers, thereby making the voice telephone line the rural customer's only connection to the Internet. Once again, this further emphasizes the need for a higher voice grade access standard to prevent a widening of the access rate gap between rural and urban consumers.

The current supported bandwidth is 300 to 3000 Hz with unstated tolerances and no data or other technical performance requirements. While this definition is irrelevant to suburban and urban areas because they do not receive high cost support, short urban and suburban loops easily exceed the defined bandwidth and nearly every such loop provides reasonable dial-up modem performance. Urban and suburban users also have increasing numbers of data alternatives such as DSL, cable modem, and wireless broadband services.

Rural areas generally have fewer alternatives. In many areas, the telephone system is the only practical way of obtaining access to the Internet. If the Commission continues to define voice grade bandwidth at its current level, the universal service support mechanism will continue to fail to provide rural communities with a modern rate of Internet access. For the development and survivability of rural communities, it is critical that the definition include the capability to transmit and receive data at a rate of at least 28 kilobits per second.

#### A Lowest Common Denominator Definition Neither Preserves nor Advances Universal Service

Under the 1996 Act, Congress established six Principles on which *(t)he Joint Board and the Commission shall base policies for the preservation and advancement of universal service....* Two of the Principles provide that *(a)ccess to advanced telecommunications and information services should be provided in all regions of the nation* and that such services should be *reasonably comparable to those services provided in urban areas...* and that such services are *...available at rates that are reasonably comparable to rates charged for similar services in urban areas.* The 1996 Act also states that universal service is an *evolving* level of service.<sup>10</sup>

This argument focuses on the May 8 Order's<sup>11</sup> implicit assumption that voice grade service is sufficient for access to the Internet. If so, the voice grade facilities supported by universal

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10. See *Supra* Note 1 at Section 254(b) and (c).

11. See *In the Matter of Federal-State Joint Board on Universal Service*, Report and Order, CC Docket No. 96-45 (released May 8, 1997) at paragraph 83.

service funds should be capable of transmitting data in the same, exact manner as voice grade facilities in suburban and urban areas, *i.e., comparable services at comparable rates.*

When the original definition was established, the Commission, acting on the recommendation of the Joint Board, chose to support only voice grade access and to exclude any information rate performance standard from the definition, whether that information rate is “advanced” or not.<sup>12</sup> Explicit in that choice was the reasoning that a voice circuit was capable of providing data access and that higher rates (presumably advanced services, *i.e.,* broadband) while helpful were not *essential to education, public health, or public safety* and that such services had not *through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers.* The May 8 Order was silent on the question of whether advanced services were *being deployed in public telecommunications networks by telecommunications carriers* and whether advanced services were *consistent with the public convenience and necessity.* We know today that they are. The current definition is also inconsistent with the universal service Principle of providing access to advanced services for all Americans.

At the time the definition was adopted in May of 1997, urban and suburban users operating over short loops typically connected to the Internet at 28 kilobits per second or better. The 3500 Hz bandwidth defined in the May 8 Order (500-4000 Hz), allowed such connection rates if the channel were otherwise suitable. Therefore, the original definition was consistent with the ability to provide *comparable services at comparable rates.*

However, in December of 1997, the Commission reduced the definition of voice-grade bandwidth to 2700 Hz (300-3000 Hz). This bandwidth is the lowest common denominator of voice grade service available - more usually associated with mobile service than with residential telephone service. It does not generally support data rates in excess of 14.4 kilobits per second.<sup>13</sup> All else being equal, the 2700 Hz standard for high cost rural areas is not *reasonably comparable* to the performance of ordinary urban voice circuits. All else, however, is not equal. The degradations that affect data performance on a loop increase with length. Rural loops are generally longer than urban loops thereby making them noisier by exposing them to more noise sources, such as power lines. The current definition does not, therefore, advance universal service, it actually may serve to depress the level of service if all new supported voice service facilities were built to this lowest common denominator.

#### A Policy of “Technological Neutrality” Must Not Ignore Functionality and Capability

RUS generally supports the Commission’s stated policy of technological neutrality. In fact, RUS has a 50-year history of pursuing new technological solutions to the challenge of providing the nation’s most rural customers with the services now described in Section 254. However, we have learned that each technology has its strengths and weaknesses, and the nation’s universal service objectives can only be met if we define performance requirements by combining strengths. The universal service objectives of the 1996 Act will not be achieved if the definition

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12. *Id.*

13. As noted in our previous comments, bandwidth alone is only a partial measure of voice grade quality and of the information rate that a voice channel is capable of supporting. The other indispensable measure is Signal-to-Noise ratio. And neither measure is meaningful unless the testing procedure is known. *See* [www.usda.gov/rus/telecom/telecomact/04-11xp-voice.htm](http://www.usda.gov/rus/telecom/telecomact/04-11xp-voice.htm) and [www.usda.gov/rus/telecom/telecomact/01-19com](http://www.usda.gov/rus/telecom/telecomact/01-19com).

of supported services becomes an exercise in finding the lowest common denominator of the different technologies' capabilities.

Pursuing the lowest common denominator suggests that, in terms of performance, all technologies are equal. Customers know that technologies are different and subscribe to different services to meet different needs. Urban customers who need to use a voice grade service for their computer modems subscribe to wireline service. Customers who need mobile telecommunications subscribe to cellular or PCS. In fact, most households today have decided that they need both, and subscribe to both, if available.

Trying to define a voice grade standard by combining the weaknesses of both wireline and mobile wireless technologies supposes that they are interchangeable; when, in fact, they clearly are not. The dramatic advance in mobile wireless service penetration rates in the last five years, coupled with the fact that wireline penetration rates have not declined, only supports the premise that wireline and wireless services are not interchangeable or equivalent.

RUS believes that the resilience of wireline service is due largely to the public's dependence upon it for computer modem communications. In recent years, the majority of line growth at the more rural RUS-financed local exchange carriers is due to customers purchasing "computer lines." The current bandwidth requirement for voice grade service (300-3000 Hz) is set so low that customers whose voice grade service meets only this minimum must connect to the Internet at painfully slow speeds, typically 14.4 kilobits per second. In fact, if the voice circuit is noisy or if the method of transmission employs digital or analog compression techniques, or if the circuit is inductively loaded, performance factors not contemplated in the current definition, the data performance can easily fall below 9.6 kilobits per second.

#### A Policy of Technological Neutrality Cannot Ignore Reach and Price

Technologies that aren't deployed cannot provide service. Rural America's need for dial-up modem access at rates currently available to most urban and suburban Americans is even more urgent now that it has become apparent that broadband services are not being rapidly deployed in rural areas. Urban and suburban customers increasingly have a broadband alternative to dial-up modem access, but most rural customers do not. RUS has demonstrated that approximately 14-19% of American households live outside of the areas served by Cable TV and that the vast majority of the unserved areas are rural.<sup>14</sup> Therefore, as many as 19% of American households may not have a cable modem alternative.

As for emerging technologies such as MMDS or LMDS, few rural areas have access to such services. The market has demonstrated that these solutions have technological problems and are more costly than originally predicted. Similarly, just as with wireline service, the cost-per-customer rises rapidly with declining population density. In urban areas, many highly touted deployments have been abandoned. Even the once-anticipated low earth orbit satellite systems have been substantially delayed.

Only two technologies exist with essentially ubiquitous reach in rural America – geo-stationary satellite and telephone. Geo-stationary satellites have one advantage, particularly for

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14. See [www.usda.gov/rus/telecom/telecomact/cablavail-xp.pdf](http://www.usda.gov/rus/telecom/telecomact/cablavail-xp.pdf).

broadcasting. Unlike urban residents who have buildings blocking their line-of-sight, almost all rural residents, particularly those in the more remote areas, can “see” a satellite. However, voice service over geo-stationary satellite suffers from long delays that make it an unattractive option, except in the most remote areas. Data service provided by satellite is very expensive - so while it may provide *comparable service* it does not do so at *comparable rates*. Satellites also suffer from insufficiently acknowledged capacity problems that ultimately make them less suitable for voice and broadband than for broadcast where everyone receives the same signal.<sup>15</sup>

Telephone plant, therefore, becomes the principal facility that can provide quality voice and tolerable data rates to virtually every home in rural America – thereby making the definition of voice grade access a crucial universal service issue. For almost everyone in high-cost rural areas, dial-up access over a telephone voice circuit is the only practical and affordable way to gain access to the Internet. Therefore, it is critical to the service quality of rural America that an information rate be made part of the definition of universal service and that rate must be no lower than the V.34 standard.

#### Mobile Telephony Meets the Four Criteria and Should be Part of the Universal Service Mechanism.

Having recognized that mobile and fixed services are fundamentally different, it is time to consider adding mobile service as a supported service. Mobile voice service meets all four criteria for the definition of universal service. It is clearly *essential to education, public health, and public safety*. If there was any doubt before September 11, 2001, that doubt is gone. It is also *being deployed in public telecommunications networks by telecommunications carriers* and is *consistent with the public interest, convenience and necessity*. And, *it has been subscribed to by a substantial majority of residential customers*. Telephone service penetration as measured by the Census is and has been hovering at approximately 94% for many years. During the last twenty years, mobile service has grown to the point where there are more wireless lines than households with wireline service, yet there has been no effect on land line penetration.<sup>16</sup>

By this comparison, mobile telephony is a fundamentally different service and has reached a level of “subscription by a substantial majority.” It can be easily demonstrated that mobile service is spotty or non-existent in many parts of rural America further supporting the premise that mobile telephony should become a distinct form of supported service under the universal service mechanism.

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15. Most current satellite data service is provided by DBS television services. According to these providers, they do not have, and will not have for considerable time, sufficient spectrum and/or spot-beam satellites to provide all 1600 local television stations to their customers. Even if they had this capability, sixteen hundred television signals in MPEG-2 at 3 Megabits per second equate to approximately 4.8 Gigabits per second. This is equivalent to only forty-eight 100 Megabit campus-type ethernet systems. This is not a trivial capacity but it is tiny compared to the needs of rural America even if it were set aside for that purpose and supported. The unavailability of spectrum is a serious limitation for satellites. As noted by author George Gilder in *Telecosm*, one fiber strand has 100 times the carrying capacity of all the satellites in space put together.

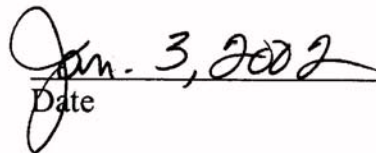
16. Residential households with telephone service at year-end 1999 was 99.1 million. See *Trends in Telephone Service*, FC C, [www.fcc.gov/ccb/stats](http://www.fcc.gov/ccb/stats). As of June 2001, there were 118.4 million mobile wireless lines and that number had grown at a 22% rate from the previous year. See *CTIA's Semi-Annual Wireless Industry Survey Results*, [www.wow-com.com/pdf/wireless\\_survey\\_2000a.pdf](http://www.wow-com.com/pdf/wireless_survey_2000a.pdf).

Conclusion

The definition of supported services underway in this proceeding is critical to rural Americans because voice grade service is the only way most can gain access to the Internet. Unlike their urban and suburban counterparts, they do not have the alternative of broadband access. The current definition of the bandwidth of voice grade service assures only about 14.4 Kb/s access, a rate that became obsolete in America's cities 10 years ago. A primary use of voice grade service for rural users is Internet access, and the currently assured rate of that access threatens rural businesses, rural schools, and rural families.

RUS, therefore, respectfully requests that the Commission adopt an evolutionary approach to defining supported services, by combining the strengths of today's technologies, not by combining their weaknesses. A minimum data transfer rate of 28.8 Kb/s should be adopted. As a component of this evolutionary approach, RUS also recommends that the Commission consider mobile service, in high cost to serve rural areas, as a separate supportable service under the definition of universal service. The economic viability of rural America depends on it.

  
 Administrator  
 Rural Utilities Service

  
 Date

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